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EXAMINER
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ZERVIGON, RUDY

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 05/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

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**Office Action Summary**

Application No.

09/807,589

Applicant(s)

PRETI ET AL.

Examiner

Rudy Zervigon

Art Unit

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**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --****Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 April 2001.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>7/23/2001</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. Regarding claims 1-15, the phrase "such as" renders the claims indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).
4. Claim 1 recites the limitation "and shoulder". There is insufficient antecedent basis for this limitation in the claim.
5. Claim 2 recites the limitation "the upper thickened flange", "the annular flange". There is insufficient antecedent basis for these limitations in the claim.
6. Claim 3 recites the limitation "the annular flange". There is insufficient antecedent basis for these limitations in the claim.
7. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: Claim 1 recites "the baffles having a length". It is uncertain which length, of three, Applicant refers.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1, 2, and 4-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Conger, Darrell R. (US 4,761,269 A) in view of Tomoyasu, Masayuki et al. (US 5,888,907 A) and Pozzetti, V et al (EP 415191 A). Conger, Darrell R. et al teaches a reaction chamber (Figure 5; column 7, line 48-68) comprising a belljar ("quartz dome", 112; Figure 5; column 5, line 54 - column 6, line 14) made of insulating and transparent material, such as quartz, a susceptor (114; Figure 5; column 5, line 54 - column 6, line 14) provided with disk-shaped cavities (holding substrates 14; Figure 5; column 5, line 54 - column 6, line 14) for receiving wafers (14; Figure 5; column 5, line 54 - column 6, line 14) of material to be treated and having an insulating and chemically resistant plate (lower portion of "quartz dome" above 114; Figure 5; column 5, line 54 - column 6, line 14) arranged above it, characterized by using: a diffuser (16; Figure 2,5; column 5, line 54 - column 6, line 14; column 7, lines 49-68) formed by a cap (16; Figure 2; column 5, line 54 - column 6, line 14) supplied by a central dome-piece (28; Figure 2; column 5, line 54 - column 6, line 14) connected to a symmetrical annular distribution chamber (80; Figure 2; column 5, line 54 - column 6, line 14) – claim 1. Applicant's claim 1 requirement of "Improved reaction chamber for an epitaxial reactor " is an intended use claim requirement. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at

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409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

Conger further teaches:

- i. Conger's cylindrical zone (upper portion of 112) of Conger's belljar ("quartz dome", 112; Figure 5; column 5, line 54 - column 6, line 14) extended above Conger's plate (lower portion of "quartz dome" above 114; Figure 5; column 5, line 54 - column 6, line 14) supported above Conger's susceptor (114; Figure 5) so as to eliminate any interference between Conger's plate (lower portion of "quartz dome" above 114; Figure 5; column 5, line 54 - column 6, line 14) and shoulder (curved upper portion of 112; Figure 5); a minimum internal diameter of Conger's belljar ("quartz dome", 112; Figure 5; column 5, line 54 - column 6, line 14) so as to keep Conger's belljar ("quartz dome", 112; Figure 5; column 5, line 54 - column 6, line 14) as far away as possible from Conger's susceptor (114; Figure 5; column 5, line 54 - column 6, line 14) – claim 1
- ii. Reaction chamber (Figure 5; column 7, line 48-68) for Conger's epitaxial reactor, according to Claim 1, characterized in that Conger's cap (16; Figure 2; column 5, line 54 - column 6, line 14) of Conger's diffuser (16; Figure 2; column 5, line 54 - column 6, line 14; column 7, lines 49-68) is fixed to Conger's annular flange (lowest portion of 16; Figure 2) which is in turn fixed to Conger's (upper-most portion of 12; Figure 2) of Conger's belljar ("quartz dome", 112; Figure 5; column 5, line 54 - column 6, line 14) by

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means of Conger's pair of two half counter-flanges (128; Figure 5) gripping Conger's annular flange (lowest portion of 16; Figure 2) against Conger's upper flange (16/112 interface; Figure 5) of Conger's belljar ("quartz dome", 112; Figure 5; column 5, line 54 - column 6, line 14), as claimed by claim 2

- iii. Reaction chamber (Figure 5; column 7, line 48-68) for Conger's epitaxial reactor, according to Claim 2, characterized in that Conger's cap (16; Figure 2; column 5, line 54 - column 6, line 14) is closed at Conger's top by a flange (28/16 interface; Figure 2) terminating in Conger's dome-piece (28; Figure 2; column 5, line 54 - column 6, line 14) communicating with Conger's sleeve (horizontal portion of 28; Figure 2; column 5, line 54 - column 6, line 14) for connection to Conger's external source of gas (56/36; Figure 1; column 5, line 54 - column 6, line 14) to be used in Conger's same reaction chamber (Figure 5; column 7, line 48-68), which dome-piece is provided with Conger's bottom (piece above 86; Figure 2; column 5, line 54 - column 6, line 14) defining at least one circular slit (88; Figure 2) for ensuring Conger's rigorously uniform distribution of gas to Conger's annular chamber (80; Figure 2; column 5, line 54 - column 6, line 14) – claim 4
- iv. Reaction chamber (Figure 5; column 7, line 48-68) for Conger's epitaxial reactor, according to Claim 4, characterized in that, in addition to Conger's slit (88; Figure 2) in Conger's bottom (piece above 86; Figure 2; column 5, line 54 - column 6, line 14), Conger's further annular slit (88; Figure 2) helps ensure Conger's uniform distribution of gas to Conger's annular chamber (80; Figure 2; column 5, line 54 - column 6, line 14) – claim 5

Conger does not teach:

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- i. Conger's symmetrical annular distribution chamber (80; Figure 2; column 5, line 54 - column 6, line 14) has a plurality of pipes of the same length which connect Conger's annular chamber (80; Figure 2; column 5, line 54 - column 6, line 14) of Conger's cap (16; Figure 2; column 5, line 54 - column 6, line 14) to Conger's dome zone (112; Figure 5) of Conger's belljar ("quartz dome", 112; Figure 5; column 5, line 54 - column 6, line 14) situated just underneath Conger's neck (upper portion of 112; Figure 5; column 5, line 54 - column 6, line 14) connecting Conger's upper flange (16/112 interface; Figure 5) to Conger's dome (112; Figure 5) – claim 1
- ii. the plurality of pipes ensuring a uniform distribution of flow at a lower speed – claim 1
- iii. on Conger's corners of Conger's susceptor (114; Figure 5; column 5, line 54 - column 6, line 14), in its upper zone, projecting baffles inserted into recesses formed in Conger's body of Conger's susceptor (114; Figure 5; column 5, line 54 - column 6, line 14), the baffles having a length about half that of the corners of Conger's susceptor (114; Figure 5; column 5, line 54 - column 6, line 14) – claim 1
- iv. a plurality of pipes emerging from Conger's distributor (16; Figure 2; column 5, line 54 - column 6, line 14) inside Conger's bell jar (112; Figure 5) – claim 4
- v. outlet pipes – claim 5
- vi. Reaction chamber (Figure 5; column 7, line 48-68) for Conger's epitaxial reactor, according to Claim 4, characterized in that Conger's cap (16; Figure 2; column 5, line 54 - column 6, line 14) of Conger's distributor (16; Figure 2; column 5, line 54 - column 6, line 14) comprises an internal chamber for a flow of a cooling fluid – claim 6

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- vii. Reaction chamber (Figure 5; column 7, line 48-68) for Conger's epitaxial reactor, according to Claim 4, characterized in that outlet pipes are made of a material which is chemically inert with respect to a gas used in Conger's belljar ("quartz dome", 112; Figure 5; column 5, line 54 - column 6, line 14) - claim 7
- viii. Reaction chamber (Figure 5; column 7, line 48-68) for Conger's epitaxial reactor, according to Claim 7, characterized in that said outlet pipes are made of glass, as claimed by claim 8
- ix. Reaction chamber (Figure 5; column 7, line 48-68) for Conger's epitaxial reactor, according to Claim 7, characterized in that said outlet pipes are made of ceramic material, as claimed by claim 9
- x. Reaction chamber (Figure 5; column 7, line 48-68) for Conger's epitaxial reactor, according to Claim 7, characterized in that said outlet pipes are made of quartz, as claimed by claim 10
- v. A Reaction chamber (Figure 5; column 7, line 48-68), according to Claim 1, characterized in that baffles fixed to Conger's susceptor (114; Figure 5; column 5, line 54 - column 6, line 14) are made of material chemically inert with respect to Conger's gases used in Conger's Conger's chamber, as claimed by claim 11

Tomoyasu, Masayuki et al teaches:

- xi. symmetrical annular distribution chambers (62, 44a-d; Figure 1) has a plurality of pipes (46, 64; Figure 1) of the same length which connect Tomoyasu's annular chamber (62, 44a-d; Figure 1) of Tomoyasu's cap (42) to Tomoyasu's dome zone (4) of Tomoyasu's - claim 1



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- xii. the plurality of pipes ensuring a uniform distribution of flow at a lower speed - Applicant's claim 1 requirement of "...the plurality of pipes ensuring a uniform distribution of flow at a lower speed..." is an intended use claim requirement. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02). The Examiner argues that there is no structural difference between the claimed invention's symmetrical annular distribution chambers with a plurality of pipes and the prior art symmetrical annular distribution chambers with a plurality of pipes
- xiii. a plurality of pipes (46, 64; Figure 1) emerging from Tomoyasu's distributor (30) inside Tomoyasu's reactor (4; Figure 1) – claim 4
- xiv. outlet pipes (46, 64; Figure 1) – claim 5
- xv. Reaction chamber (4; Figure 1) for Tomoyasu's reactor, according to Claim 4, characterized in that Tomoyasu's cap (42) of Tomoyasu's distributor (30) comprises an internal chamber (82) for a flow of a cooling fluid – claim 6
- xvi. Reaction chamber (4; Figure 1) for Tomoyasu's reactor, according to Claim 4, characterized in that outlet pipes (46, 64; Figure 1) are made of a material which is

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chemically inert ("aluminum covered with the anodized surface"; column 5, lines 53-58)  
with respect to a gas used in Tomoyasu's reactor - claim 7

- xvii. Reaction chamber (4; Figure 1) for Tomoyasu's reactor, according to Claim 7, characterized in that said outlet pipes (46, 64; Figure 1) are made of glass ("aluminum covered with the anodized surface" –  $\text{Al}_2\text{O}_3$ ; column 5, lines 53-58), as claimed by claim 8
- xviii. Reaction chamber (4; Figure 1) for Tomoyasu's epitaxial reactor, according to Claim 7, characterized in that said outlet pipes (46, 64; Figure 1) are made of ceramic material ("aluminum covered with the anodized surface" –  $\text{Al}_2\text{O}_3$ ; column 5, lines 53-58), as claimed by claim 9

Pozzetti teaches:

- xix. a susceptor (132; Figure 8) projecting baffles (147a-f; Figure 8) inserted into recesses (146a-f/147a-f interfaces) formed in a body of the susceptor (132; Figure 8), the baffles having a length (compare Figure 1 of Applicant's invention with Figure 8 of Pozzetti) about half that of the corners of the susceptor – claim 1
- xx. A Reaction chamber (12; Figure 1), according to Claim 1, characterized in that baffles (147a-f; Figure 8) fixed to Pozzetti's susceptor (132; Figure 8) are made of material chemically inert with respect to Pozzetti's gases used in Pozzetti's chamber, as claimed by claim 11. Applicant's claim 11 requirement of "are made of material chemically inert with respect to gases used in the chamber" is an intended use claim requirement. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769,

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205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

- vi. A Reaction chamber (12; Figure 1), according to Claim 1, characterized in that baffles (147a-f; Figure 8) fixed to Pozzetti's susceptor (132; Figure 8) are made of material chemically inert (column 8, lines 18-22) with respect to Pozzetti's gases used in Pozzetti's chamber, as claimed by claim 11

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Conger to add a plurality of pipes of the same length as taught by Tomoyasu, replace Conger's susceptor with Pozzetti's susceptor having projecting baffles inserted into recesses formed in Pozzetti's body of Pozzetti's susceptor as taught by Pozzetti, and add an internal chamber to Conger's distributor for a flow of a cooling fluid as taught by Tomoyasu.

Motivation for Conger to add a plurality of pipes of the same length as taught by Tomoyasu is for uniform process gas application as taught by Tomoyasu (column 8, lines 22-32), replace Conger's susceptor with Pozzetti's susceptor having projecting baffles inserted into recesses formed in Pozzetti's body of Pozzetti's susceptor as taught by Pozzetti is for maintaining uniform film growth across process wafers as taught by Pozzetti (column 7, lines 37-40), and add an internal chamber to Conger's distributor for a flow of a cooling fluid as taught by Tomoyasu is for maintaining the process gases at a predetermined temperature as taught by Tomoyasu (column 6, lines 55-67).

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10. Claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Conger, Darrell R. (US 4,761,269 A), Tomoyasu, Masayuki et al. (US 5,888,907 A), Pozzetti, V et al (EP 415191 A) in view of Wu, Robert W. (US 5,910,221 A). Pozzetti further teaches graphite as a material for Pozzetti's susceptor (column 8, lines 4-6). None of Conger, Tomoyasu, and Pozzetti teach:

- vii. Reaction chamber (12; Figure 1) for Pozzetti's reactor, according to Claim 11, characterized in that the baffles are (147a-f; Figure 8) fixed to Pozzetti's susceptor (132; Figure 8) are made of ceramic material, as claimed by claim 13
- viii. Reaction chamber (12; Figure 1) for Pozzetti's epitaxial reactor, according to Claim 11, characterized in that the baffles (147a-f; Figure 8) fixed to Pozzetti's susceptor (132; Figure 8) are made of quartz, as claimed by claim 14
- ix. Reaction chamber (12; Figure 1) for Pozzetti's reactor, according to Claim 11, characterized in that the (147a-f; Figure 8) fixed to Pozzetti's susceptor (132; Figure 8) are made of graphite lined with silicon carbide, as claimed by claim 15

Wu teaches chemically inert materials including ceramics, quartz, and silicon carbide for reactor components in harsh chemical environments (column 1, lines 11-33; abstract)

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Conger, Tomoyasu, and Pozzetti to replace their stated materials for the materials as taught by Wu.

Motivation for Conger, Tomoyasu, and Pozzetti to replace their stated materials for the materials as taught by Wu is for maintaining reactor chamber components inert to the processing environment as taught by both Pozzetti (column 8; lines 18-22) and Wu (abstract).

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***Allowable Subject Matter***

11. Claim 3 would be allowable if rewritten to overcome the rejection under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims. None of the prior art teach or suggest "fixing of the cap of the diffuser to the annular flange is performed by means of a plurality of spring-loaded tie-rods which push in an elastic manner to the cap against the annular flange".

***Conclusion***

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 20040040502 A1; US 20030019428 A1; US 20020108711 A1; US 6562128 B1; US 6539890 B1; US 6475284 B1; US 6203620 B1; US 6125788 A; US 6015595 A; US 5964948 A; US 5908504 A; US 5900297 A; US 5846883 A; US 5681418 A; US 5595606 A; US 5453124 A; US 5304247 A; US 5264040 A; US 5038711 A; US 4961399 A; US 4928626 A; US 4911102 A; US 4807562 A; US 4747367 A; US 4638762 A; US 4632060 A; US 4579080 A; US 4421786 A; US 4322592 A; US 3865072 A; US 3603284 A; US 4638762 A; DE 3525870 A; EP 131208 A

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272.1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official after fax phone number for the 1763 art unit is (703) 872-9306. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If

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the examiner can not be reached please contact the examiner's supervisor, Gregory L. Mills, at  
(571) 272-1439.



Handwritten signature of Gregory L. Mills, dated 5/20/14.